

Flight Equipment Pre- Shipment Readiness Review (JSC Form 1027)

NT/Flight Equipment Division

**September 25, 2002
Revision A**

Verify that this is the correct version before use

**National Aeronautics and
Space Administration**

**Lyndon B. Johnson Space Center
Houston, Texas**

Flight Equipment Division JSC Common Work Instruction	Flight Equipment Pre-Shipment Readiness Review (JSC Form 1027)	
	Document No.: NT-CWI-004	Revision: A
	Date: 09/25/2002	Page 2 of 11

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September 25, 2002

Approved by

Original Signed by
David F. Thelen, Chief
Flight Equipment Division

Concurrence:

Original Signed by
Larry Dyer
Quality Systems Panel

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Flight Equipment Division JSC Common Work Instruction	Flight Equipment Pre-Shipment Readiness Review (JSC Form 1027)	
	Document No.: NT-CWI-004	Revision: A
	Date: 09/25/2002	Page 3 of 11

Change Record

Revision	Date	Originator/Phone	Description
Baseline	11/24/1998	Pedro Rivera 244-5299	Baseline Release
PCN-1	03/09/2001	MLC	<ul style="list-style-type: none"> Changed OSIAD to FED as a result of the SR&QA reorganization that occurred February 2001. Added QSP concurrence signature. Removed division level from document number (from NT1-CWI-004 to NT-CWI-004).
PCN-2	06/27/2002	MLC David W. Dyer 483-4334	Changed Author to David W. Dyer
A	09/25/2002	David Dyer 483-4334	Complete Re-write. Title was changed from Flight Equipment Acceptance Review. Originator was changed.

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Flight Equipment Division JSC Common Work Instruction	Flight Equipment Pre-Shipment Readiness Review (JSC Form 1027)	
	Document No.: NT-CWI-004	Revision: A
	Date: 09/25/2002	Page 4 of 11

Table of Contents

1 PURPOSE.....	5
2 SCOPE.....	5
3 DEFINITIONS.....	5
4 RECORDS.....	6
5 SAFETY PRECAUTIONS AND WARNING NOTES	6
6 REFERENCES.....	7
7 TOOLS, EQUIPMENT, AND MATERIALS.....	7
8 PERSONNEL TRAINING AND CERTIFICATION.....	7
9 RESPONSIBILITIES	7
9.1 Technical Representative (TR)	7
9.2 Quality Assurance Representative (QAR).....	7
9.3 Quality Assurance Record Center (QARC)	7
10 PROCEDURE.....	8
10.1 Initiation	8
10.2 Review.....	8
10.3 Approval	9
10.3.1 No Open Items	9
10.3.2 Open Item(s).....	9
10.3.3 Preplanned/Forward Work Exception	10
10.3.4 Quality Verification	10
10.4 Original Record.....	10
10.5 Copies	10
10.6 Special Situations.....	10
10.6.1 Non-JSC Flight Equipment.....	10
10.6.2 “In-place” 1027	11
10.6.3 Revisions Due to Re-Manifesting	11
10.6.4 Pyrotechnics Deviation	11

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

Flight Equipment Division JSC Common Work Instruction	Flight Equipment Pre-Shipment Readiness Review (JSC Form 1027)	
	Document No.: NT-CWI-004	Revision: A
	Date: 09/25/2002	Page 5 of 11

1 PURPOSE

The purpose of this procedure is to ensure flight equipment being shipped for flight is ready for shipment and follow-on flight processing/integration, i.e. it is certified for the mission, open issues have been resolved, open work has been completed, if needed, ground processing open work has been scheduled (identified) and, if applicable, there is sufficient life usage remaining to support the identified mission. This includes equipment that is being shipped directly to a launch site or to a location or facility that performs flight integration and/or packing (For example, USA FCE/EVA). **NOTE: The JSC Form 1027 does not certify flight equipment for spaceflight use.**

2 SCOPE

This procedure is applicable for all Johnson Space Center (JSC) developed or provided government furnished equipment (GFE) (hardware and software) and payloads being shipped for flight integration. Local offsite contractors (e.g. USA-FCE/EVA, Lockheed Martin, etc.) shall comply with this procedure or a NASA approved equivalent.

3 DEFINITIONS

3.1 Acceptance Data Package (ADP) – Provides a complete and verified status of hardware or software at the point of delivery and enables the continuation of required activities by the using organization. The ADP is prepared as part of the hardware or software acceptance/delivery criteria and is maintained throughout the hardware or software life cycle after government acceptance, including integrated testing, ground processing, launch site processing, on orbit, postlanding, and maintenance/modification/refurbishment activities.

3.2 Acceptance Testing - Tests to determine that a part, component, subsystem, or system is capable of meeting performance requirements prescribed in the purchase specification or other documents specifying what constitutes adequate performance capability for the item in question. The term Pre-Delivery Acceptance (PDA) is sometimes used to describe this activity.

3.3 Flight Equipment - Items (hardware and software) developed and provided for use in space, i.e. Class I. For the purposes of this document, this includes payloads, detailed test objectives/detailed supplementary objectives, experiments, etc.

3.4 Open Items - Work or issues that have not been completed/resolved by the appropriate authority prior to delivery for flight integration. Examples are unplanned/deferred work processing or testing, preplanned/forward work, nonconformance or problem reports without an approved disposition, lack of approved flight certification, open waivers, etc.

3.5 Pre-Installation Acceptance (PIA) Tests - Functional tests or inspections performed on components prior to installation into next higher assembly when any of the following circumstances exist:

- (1) No previous acceptance test;
- (2) Acceptability cannot be verified by test of next higher assembly;

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

Flight Equipment Division JSC Common Work Instruction	Flight Equipment Pre-Shipment Readiness Review (JSC Form 1027)	
	Document No.: NT-CWI-004	Revision: A
	Date: 09/25/2002	Page 6 of 11

- (3) A significant time has elapsed since the last test. Such time period shall be determined from the age/life characteristics of the component;
- (4) Where the component, once installed in the next higher assembly, is difficult to remove and requires significant schedule time to replace;
- (5) Where prior failure history of the component indicates the need for pre-installation testing; or
- (6) Where the component, once installed in the next higher assembly, by its failure could damage the next higher assembly during test.

3.6 Preplanned/Forward Work - Work authorized for accomplishment after delivery or shipment because the Program desires, is deferred for safety reasons, or is required to restore the item from alterations/differences necessary for shipping.

3.7 Quality Assurance Representative (QAR) - The assigned JSC Quality Engineer or JSC Quality Assurance Specialist (QAS) participating in the review.

3.8 Ship Short – A situation where an item is intentionally shipped with unaccomplished activities or out-of-configuration but is not acceptable to launch without accomplishing the activities or putting the item into the approved configuration. This includes pre-planned open work and deferred open work.

3.9 Ship Short/Launch Short – A situation where an item is intentionally shipped and launched with open actions or out-of-configuration. This always requires Program approval and a signed waiver when out-of-configuration. For the ISS Program, the Program S&MA Office/OE will determine if a Yellow Tag is also required.

3.10 Technical Representative (TR) - The Project Manager/Responsible Design Engineer (PM/RDE) responsible for identifying the flight equipment to be delivered and supporting resolution of any identified open items. The TR is responsible for the Certificate of Flight Readiness for the equipment.

3.11 Unplanned/Deferred Work – Unaccomplished fabrication, test, inspection, or installation activities remaining to be completed at time of acceptance and delivery due to parts shortages, lack of schedule time, etc., including open Material Review Actions, open Discrepancy Reports, and other Open Work, applicable to the hardware being delivered.

4 RECORDS

JSC Form 1027, *Flight Equipment Pre-Shipment Readiness Review*
Flight Equipment Pre-Shipment Readiness Review Checklist

5 SAFETY PRECAUTIONS AND WARNING NOTES

None

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

Flight Equipment Division JSC Common Work Instruction	Flight Equipment Pre-Shipment Readiness Review (JSC Form 1027)	
	Document No.: NT-CWI-004	Revision: A
	Date: 09/25/2002	Page 7 of 11

6 REFERENCES

[JB9W-09, How to Prepare and Process JSC Form 290, "Shipping Document"](#)
[NSTS 08060, System Pyrotechnic Specification](#)

7 TOOLS, EQUIPMENT, AND MATERIALS

None

8 PERSONNEL TRAINING AND CERTIFICATION

None

9 RESPONSIBILITIES

9.1 Technical Representative (TR)

The TR is responsible for:

- Identifying the equipment to be shipped and its destination or mission;
- Completing the shipping documentation and recording (if applicable) ship short or ship short/launch short status and/or special packaging and/or handling requirements. (Ref. JB9W-09 for instructions on how to complete a JSC Form 290. Note: Off-site contractors typically use DD 1149, *Requisition and Invoice/Shipping Document* or the commercial equivalent in lieu of the JF 290);
- Assisting the QAR in the identification of pre-planned or deferred open work and ensuring it has been coordinated to be accomplished; and
- Ensuring all of the proper signatures are obtained on the JF 1027.

9.2 Quality Assurance Representative (QAR)

The QAR is responsible for:

- Accessing SR&QA databases and quality records to identify open items;
- Recording limited life information;
- Ensuring the ADP, when applicable, is updated;
- Coordinating with the TR to ensure that all pre-planned or deferred open work has been coordinated to be accomplished; and
- Ensuring all of the proper signatures are obtained on the JF 1027.

9.3 Quality Assurance Record Center (QARC)

The QARC is responsible for issuing a control number for the JF 1027, entering the data into the QARC database and maintaining the original document upon completion.

Flight Equipment Division JSC Common Work Instruction	Flight Equipment Pre-Shipment Readiness Review (JSC Form 1027)	
	Document No.: NT-CWI-004	Revision: A
	Date: 09/25/2002	Page 8 of 11

10 PROCEDURE

10.1 Initiation

10.1.1 The initiator (typically the TR) will obtain a current version of the [Flight Equipment Pre-Shipment Readiness Review Checklist](#) and JF 1027 via the JSC home page link, <http://forms.jsc.nasa.gov/>.

10.1.2 Using the data sheet that accompanies the form, the initiator will record the following items:

- Equipment name, part number, serial/lot number (if applicable) and the quantity;
- The mission the equipment is to be flown aboard or the location it is to be delivered for flight integration;
- Any hazards associated with the equipment, e.g. batteries are considered to be hazardous; and
- Identification of preplanned or forward work, scheduled to be performed after shipment but prior to flight, e.g. charging of O₂ bottles. Record the work authorizing document number (e.g., Task Performance Sheet) or equivalent that implements the work. (Note: this should also be referenced in the ADP.)

10.2 Review

10.2.1 Using the [Pre-Shipment Readiness Review Checklist](#) the TR and QAR shall conduct the readiness review.

10.2.2 The QAR shall perform the following actions:

- Verify the certification and limited life status of the base part number and dash number by either accessing and querying the GFE Certification Database or contacting the GFE Certification Database Administrator. Contact the Safety and Mission Assurance (S&MA) engineer if the item is not in the GFE certification database;
- Obtain an open item report using the QARC On-Line tool or request an open item report from the appropriate QA Record Center. If the item is serialized, only use the base part number (no dash number) and serial number. This will identify any open item that a dash number roll might mask. For large projects, the QAR may use the QARC On-Line tool to perform an open items search using the Project code, JSC Project Identification Code (JPIC) and/or sub-JPIC in an attempt to identify open work at lower indenture parts list levels. For assistance in reaching the appropriate QA record center contact the QA Record Center Lead;
- Determine if the equipment is a limited life item or contains limited life items. Record the remaining life usage available based on the base part number, dash number, and serial/lot number. Record all of the life limits. Limited Life items and their requirements are recorded in the GFE Certification database. The actual remaining life for each specific traceable item is tracked in the QARC database and the ADP;

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

Flight Equipment Division JSC Common Work Instruction	Flight Equipment Pre-shipment Readiness Review (JSC Form 1027)	
	Document No.: NT-CWI-004	Revision: A
	Date: 09/25/2002	Page 9 of 11

- d. Verify, when applicable, the ADP maintained by the QA Record Center is current. If not, the QAR must rectify any discrepancies with engineering to ensure the ADP reflects the current status of the equipment; and
- e. Access and query the Problem Reporting and Corrective Action (PRACA) database or contact the GFE PRACA Database Administrator to verify there are no open PRACA reports based on the base part number and dash number. (Serial/lot numbers, if available, are not applicable in this instance.) Open PRACA reports that have an Interim Selected Operation Disposition or Corrective Action Implementation Pending disposition clearing the specified flight are not considered open work and should not be referenced on the JF 1027;
- f. Upon completion of the review, the QAR shall request a control number from the QA Record Center and record that number on the JF 1027.

10.2.3 It is also important for the QAR and TR to collaborate to ensure that preplanned/forward or deferred work and/or special packaging and/or handling requirements are clearly stated on the shipping document. The shipping document shall have a statement to see the attached JF 1027. The JF 1027 shall also be listed as a line item on the shipper to ensure a copy of the document is sent with the equipment.

10.2.4 The control number shall be listed on the checklist, which shall be attached to the original JF 1027 and maintained as a record by the QARC.

10.3 Approval

10.3.1 No Open Items

When the certification is verified closed, there are no open items, and there is sufficient life usage available, then the TR and QAR get together and both sign off. The original form and copies are handled per paragraphs 10.4 and 10.5.

10.3.2 Open Item(s)

When open items are identified, they shall be recorded on the JF 1027 and the QAR shall annotate in the Notes/Remarks field **“The open item(s) is (are) not a constraint to release this item for flight integration for (list mission designation or destination.)”** When there are open items the following additional approvals must be obtained. See 10.3.3 for exceptions.

- a. Engineering Division Chief or designee (certification issues or for shipments prior to Systems Acceptance Review only);
- b. Engineering Directorate Project Management Office Manager or designee (certification issues or for shipments prior to Systems Acceptance Review only)
- c. The appropriate ISS or SS Program Manager or designee or the EVA Project Manager or designee; and
- d. SR&QA Flight Equipment Division Chief or designee.

VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

Flight Equipment Division JSC Common Work Instruction	Flight Equipment Pre-Shipment Readiness Review (JSC Form 1027)	
	Document No.: NT-CWI-004	Revision: A
	Date: 09/25/2002	Page 10 of 11

(Note: QAR may sign “per telecon” signatures for the above.)

The original form and copies are handled as specified in paragraphs 10.4 and 10.5.

10.3.3 Preplanned/Forward Work Exception

Preplanned/Forward work (not certification or acceptance) that has been scheduled and coordinated to be performed after shipment, e.g. controlled by an Operations and Maintenance Requirements Document at KSC, does not require the additional approvals listed in 10.3.2. The work shall be identified and listed as “open.” A statement shall be made in the remarks section indicating the open work is not a constraint to shipment but is a constraint to flight pending completion of the work. State where the work will be performed and identify the work authorizing document or procedure. The QAR must verify the flight integrator is aware of this action.

10.3.4 Quality Verification

The QAS shall verify the items listed on the JF 1027 match the shipping document, parts tag and the actual equipment. The QAS shall then stamp and date each item listed on the JF 1027.

10.4 **Original Record**

The completed original JF 1027 and completed checklist are quality records that must be returned to the QA record center that issued the control number. If needed, contact the QA Record Center Lead for assistance.

10.5 **Copies**

Copies of the approved JF 1027 (only) shall be attached to the shipping document. For equipment being shipped directly to KSC for launch integration, a copy of all approved JF1027's listing the open items shall be faxed or electronically transmitted to the JSC Launch Site Integration Office (LSIO) Quality Engineer by the QAR.

10.6 **Special Situations**

10.6.1 Non-JSC Flight Equipment

A JF 1027 is not required for non-JSC developed equipment that is sent to JSC for storage or packing and shipment only. If work, training, maintenance, or testing of the equipment is performed at JSC, then the Flight Equipment Pre-Shipment Readiness Review must be conducted to verify all the activities were satisfactorily completed.

Flight Equipment Division JSC Common Work Instruction	Flight Equipment Pre-Shipment Readiness Review (JSC Form 1027)	
	Document No.: NT-CWI-004	Revision: A
	Date: 09/25/2002	Page 11 of 11

10.6.2 “In-place” 1027

When equipment is already at the launch site integrator’s location, e.g., USA FCE/EVA or KSC, without an up-to-date valid JF 1027, an “IN-PLACE” 1027 shall be generated. For these instances the Pre-Shipment Readiness Review shall be performed and the transfer document field shall be annotated with the word “In-place” and the QA stamp column shall be annotated as not applicable (N/A). The QAR shall send a copy of this completed form to the USA FCE/EVA resident NASA SR&QA representative or the JSC LSIO Quality Engineer.

10.6.3 Revisions Due to Re-Manifesting

When a JF 1027 is completed, the information is entered into the QA Record Center database identifying the mission the equipment is flown aboard. If the equipment is subsequently de-manifested and re-manifested for another flight (i.e. does not fly on the originally specified mission), the review must be performed again. The purpose is to verify the status quo, i.e. the item is still certified, there have not been any new PRACA reports initiated, and if applicable, the item is still within limited life requirements. The TR and QAR shall coordinate their activities to revise the completed JF 1027. The QAR will draw a single line through the previous mission and annotate the new mission. If nothing has changed, only the QAR signature in the margin at the bottom is needed for approval. If open items are identified, all of the required signatures stated in 10.3.2 must be obtained. This revised copy, still having the original control number followed by a revision number (e.g. R1, R2, R3, etc.,) written in by the QAR, shall be provided to the QA record center with a note instructing the QARC to update the database with the revised information.

10.6.4 Pyrotechnics Deviation

Pyrotechnics covered by NSTS 08060 and shipped separately (not integrated into other equipment) shall not be processed as stated above. Engineering performs a review per NSTS 08060, documented on the Flight Certification, prior to shipment. In this instance, the JF 1027 Pre-Shipment Readiness Review process is used primarily to record information regarding the shipment into the QARC system. The QAR will initiate a JF 1027 and record the part name, part number, lot number, and age/life extension date (based on the manufacturing date) obtained from the pyrotechnic Flight Certification. Individual serial number identification is not required. Serial numbers are listed on the Flight Certification. The QAR will perform an open items query as indicated in 10.2.1. **Note: Pyrotechnics shall not be shipped with open items.** The QAR will record the shipping document number, attach a copy of the approved Flight Certification to the JF 1027 and deliver it to the QARC. Only the QAR signature is required.